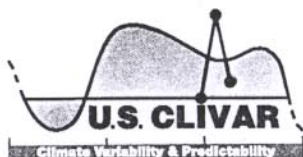


U.S. CLIVAR SCIENCE STEERING COMMITTEE

Advising the U. S. Interagency Group for CLIVAR



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Professor Chris Field
Carnegie Institution of Washington
Department of Plant Biology
260 Panama Street
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21 May 2001

Dear Professor Field,

On behalf of the U.S. CLIVAR Science Steering Committee, I would like to congratulate you on the progress that has been made toward a coherent U.S carbon-science program. We are aware both that the carbon question is central to long-term climate change and that many of the processes you will be dealing with are also critical to understanding and predicting the physical climate system. On the one hand, GEWEX, Carbon and CLIVAR are each already unmanageably complex programs. On the other, they are closely linked to form an even more complex research program on the earth system. We would like to express our interest in working with you to produce the most efficient national effort in this larger arena.

A case in point is the possible utility to both CLIVAR and Carbon of having a few global hydrographic lines re-occupied on a decadal time scale. CLIVAR's main reasons for considering supporting such a program are:

- 1) Understanding the ocean's role in long-term climate and skill of projections of global change will ultimately depend on climate system models that must accurately represent ocean processes. We believe that lateral ocean transports of heat, fresh water, and the suite of conservative and time-tagged tracers are measures of the ocean that, because they are closely related to climate dynamics, are good measures of models' ability to simulate the climate system.
- 2) The Argo system of profiling floats depends on deep temperature-salinity relations to detect slow drifts in the floats' CTDs. We know that these relations have changed on decadal time scales in some places and thus suspect that occasional re-surveys are important to the accuracy of Argo measurements.
- 3) Subduction of surface waters of time-varying composition is central to a number of leading hypotheses about linked ocean-atmosphere dynamics of climate variability. The distributions of time-tagged tracers are particularly useful in diagnosing these processes.

At the same time we understand that maintaining a census of the ocean's carbon and determining the lateral oceanic fluxes of carbon are central to your purpose, that items 1) and 3) above are pertinent to the carbon problem, and that there may be other reasons that repeated surveys are valuable in the

carbon-research context. As a consequence I invite you to join U.S. CLIVAR in addressing the repeat-survey question. There is international planning going on and the main task is, it seems to me, to devise a U.S. contribution to this international effort that will lead to cost-effectively meeting the needs of both programs.

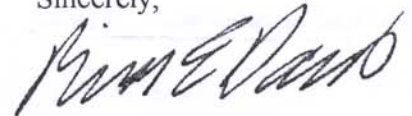
It has been suggested to me by several oceanographers including Rana Fine that a U.S. meeting to plan a possible U.S. contribution to resurveying the ocean is needed. It seems to me that the key questions such a meeting should address are:

- 1) What are the specific aspects of the climate and carbon research programs that would be aided by repeat hydrography? I see at least three ways the surveys could help. Time changes of inventories show what changes have occurred; sections measuring lateral fluxes show what the ocean is transporting; and surveys of time-tagged tracers are good comparisons for tuning and validating ocean models of slow changes.
- 2) An integrated program for carbon, hydrographic, and tracer measurements is envisioned. What are the tradeoffs in sampling density (number of lines resurveyed), sampling frequency, and suite of observed variables for both carbon and climate questions? The three ways the surveys would help science (inventories, transports and time-tagged tracers) call for rather different strategies.
- 3) What would be an appropriate level of U.S. effort inside the international context?

U.S. CLIVAR invites the U.S. Carbon Program to co-sponsor such a meeting with us. I believe there would be agency support for it and that the time is ripe. We would like the CLIVAR SSC to be consulted about who organizes the meeting, who will be invited and what tasks the meeting will address and we would look forward to your advice and consultation on these same issues.

To get things started, I might suggest that Peter Schlosser of the CLIVAR SSC, Rana Fine and/or Paul Robbins could represent the CLIVAR perspective if they were willing.

Sincerely,



Russ Davis
Co-chair US CLIVAR SSC

cc: Don Rice, NSF
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